

Upper Mississippi River Nine-Foot Channel Project,  
Lock and Dam Complex Number 16  
Spanning the Upper Mississippi River between  
Muscatine, Muscatine County, Iowa  
and  
Rock Island County, Illinois

HAER No. IA-26

HAER  
IOWA,  
70-MUSCATINE,  
1-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record  
Rocky Mountain Regional Office  
National Park Service  
U. S. Department of the Interior  
P. O. Box 25287  
Denver, Colorado 80225

## HISTORIC AMERICAN ENGINEERING RECORD

HAER  
IOWA,  
76-MUSCA.V,  
1-

### Upper Mississippi River Nine-Foot Channel Project, Lock and Dam Complex Number 16

HAER No. IA-26

**Location:** Located in the Upper Mississippi River, about a mile upstream from Muscatine, Iowa, and 457.2 river miles upstream from the confluence of the Ohio and Mississippi rivers. The complex stretches across the river at a point where the valley is wide. From the lock, the bluffs on the Illinois side are about a mile away. The esplanade adjoins the Illinois shore, the lock is just riverward of the esplanade with the movable section of the dam tying to the northernmost lock wall. The earthen embankment section of the dam extends from there, straddles portions of Hog Island in the main channel, reaching to a narrow flood plain on the Iowa shore. Corps Drawing Numbers M-L 16 10/1, 10/2, 10/8; HAER Photographs Numbers IA-26-1 through IA-26-21.

**Dates of Construction:** 1933-1937

**Present Owner:** U. S. Government  
Rock Island District  
Corps of Engineers

**Present Use:** River navigation/hydrology control

**Significance:** The U. S. Army Corps of Engineers Nine-Foot Channel Project (1927-1940) represents the culmination of a 100-year effort to improve the navigability of the Upper Mississippi River between the mouth of the Missouri River and Minneapolis, Minnesota. This specific project arose as a response to the farm crisis of the 1920s. Proponents of the New Deal adopted the project and gave speed to its construction as a means of providing public employment during the more general depression of the 1930s. By the 1940s, the completed project had converted over 650 miles of free-flowing river into a series of interconnected reservoirs which ensured enough water for fully loaded modern boats and barges to navigate the system. This constituted a significant alteration of the natural environment of the Upper Mississippi River. However, the project also brought economic benefits to the communities along and around the river corridor and lead to new recreational opportunities for the entire region.

The Upper Mississippi River Nine-Foot Channel Project inaugurated a new development in slack-water navigation system dam practice in the United States: the adoption of a non-navigable dam containing both roller and Tainter gates. Prior to the Corps' 1930 decision to build non-navigable dams on the Upper Mississippi River, United States Army engineering practice had, nearly universally, been to construct navigable dams, permitting open-river navigation at higher river stages. By 1930, European engineers had been using roller gates in dams extensively for over 25 years. However, only ten such structures had been built in the United States, and these were all located on

Upper Mississippi River Nine-Foot Channel  
Project, Lock and Dam Number 16  
HAER No. IA-26  
(Page 2)

Corps' Upper Mississippi River project dam designs expanded upon this reaches of rivers where ensuring navigability of any sort was not a design concern. It was not until 1925-1926 that civilian engineers pioneered the use, in the United States, of roller gates in combination with other types of gates. Most of the development, incorporating both roller and Tainter gates. The Corps' shift from navigable to non-navigable dams demonstrate the influence of shipping techniques on navigable waterway improvement technology. It also exemplifies the cautious nature of American Army engineers response to changes in shipping. The Corps' choice of this particular type of non-navigable movable dam illustrates the influence of the hydraulic characteristics of individual rivers on the selection of waterway improvement technologies. It also evidences the manner in which critical engineering design developments are disseminated and become accepted.

Ironically, the Upper Mississippi River Nine-Foot Channel Project also resulted in the obsolescence, by the project's end, of combination roller and Tainter gate dams. Technological advances resulting from the research and development incidental to the design and construction of the 26 lock and dam systems in this project enabled U. S. Army Corps of Engineers to develop both submersible and non-submersible Tainter gates which nearly matched the capabilities of the roller gates. Once these less expensive and easier operated and maintained gates had been developed, American engineers ceased designing or constructing combination roller and Tainter gate dams. The Corps' creation of a new dam type and its subsequent obsolescence during the course of a single project dramatically illustrates both the evolutionary nature of American engineering in general and the Nine-Foot Channel Project in particular (Text, pages 11 and 49-50. See HAER No. IA-23 for complete history, footnotes and bibliography).

Historian:

Mary Yeater Rathbun

August 1988

## PART I. HISTORICAL INFORMATION

### A. Physical History:

1. Dates of Erection: 1933-1937
2. Architect/Engineer: U. S. Corps of Engineers, Rock Island District
3. Original and Subsequent Owners: U. S. Government--Rock Island District, Army Corps of Engineers
4. Builders, Contractors, Suppliers:

General Contractor--Lock and Central Control Station Construction: Central Engineering Company, Davenport, Iowa.

#### Subcontractors:

Builders Sand and Gravel Co. ....	Placed hydraulic cofferdam fill
Davenport, Iowa	and performed excavation
Automatic Sand and Gravel Co. ....	Excavation, fill, and cofferdam
Muscatine, Iowa	fill removal
Inland Steel Company.....	Furnished steel sheet piling, tie
Chicago, Illinois	rods, plates and channel for the cofferdam; steel
	reinforcing; form bolts, plates, washers, and tie rods;
	supplied steel plates, shapes and rivets to
	R. C. Mahon
Layton and Plumb.....	Furnished timber piling
Wapello, Iowa	
Manassa Timber Company.....	Furnished timber piling
St. Louis, Missouri	
E. A. Whitney & Sons.....	Driving steel sheet and timber
Kansas City, Missouri	piling
Morrell & Sturgeon Lumber Co. ....	Supplied crib timber
Portland, Oregon	
Herbert A. Gettert.....	Supplier of derrick stone and
Muscatine, Iowa	riprap
Marsh and Truman Lumber Co. ....	Supplied oak timber and form lumber
Chicago, Illinois	
Dewey Portland Cement Co. ....	Furnished cement and crushed stone
Davenport, Iowa	
Burlington Sand and Gravel Co. ....	Furnished coarse sand
Burlington, Iowa	

Upper Mississippi River Nine-Foot Channel  
Project, Lock and Dam Number 16  
HAER No. IA-26  
(Page 4)

R. C. Mahon Company.....Furnished an installed structural  
Detroit, Michigan steel, nickle-chrome steel, steel forgings, copper,  
non-ferous metals, handrailing and brass pipe,  
installed operating machinery and rubberseals for  
the miter gates and tainter valves

Thomas Spacing Machine Co. ....Furnished miter gate and tainter  
Glenshaw, Pennsylvania valve motors

Century Electric Company.....Furnished miter gate and tainter  
Chicago, Illinois valve motors

Cutler-Hammer, Inc. ....Furnished miter gate and tainter  
Philadelphia, Pennsylvania valve brakes

Bethlehem Steel Company.....Furnished corrosion resisting steel  
Detroit, Michigan steel and bronze

The Faulk Corporation.....Furnished structural nickel steel,  
Milwaukee, Wisconsin bronze, and class "B" castings, and  
alloy castings

The Davenport Besler Corp. ....Furnished structural nickel steel,  
Davenport, Iowa bronze, and grey iron castings

H. M. Harper Company.....Furnished bronze  
Chicago, Illinois

Steel Sales Corporation.....Supplied nickel-copper alloy  
Detroit, Michigan

U. S. Rubber Company.....Supplied rubber seals for miter  
Detroit, Michigan gates and Tainter valves

The Crane Company.....Furnished 6-inch steel pipe,  
Davenport, Iowa 4-inch flanged cast iron pipe, 2-inch wrought iron  
pipe, metal conduit, 2-inch street washers, and 4-inch  
grate valves

The Crawford Company.....Furnished handrailing to R. C.  
Chicago, Illinois Mahon Company

Illinois Maleable Iron Co. ....Furnished handrailing connections  
Chicago, Illinois to R. C. Mahon Company

Tri-City Tile and Mantle Co. ....Furnished tile gauges  
Davenport, Iowa

W. S. Dickey Clay Mfg. Co. ....Supplied 10x12-inch vitrified clay  
Kansas City, Missouri pipe

Graybar Electric Company.....Supplied fiber conduit  
Davenport, Iowa

Louis Hansseen Sons.....Supplied fiber conduit  
Davenport, Iowa

Crescent Electric Company.....Supplied metal conduit  
Davenport, Iowa

5. Original Plans and Construction: U. S. Army Corps of Engineers, Rock Island District, contract drawings signed by senior engineer E. E. Abbott, direct supervision of construction--resident engineer O. R. Ramser.

Upper Mississippi River Nine-Foot Channel  
 Project, Lock and Dam Number 16  
 HAER No. IA-26  
 (Page 6)

6. Alterations and Additions:

<u>Item</u>	<u>Year</u>
Construction-500-foot cell foundation concrete extension to upstream river wall of lock	1940-1942
Land wall and lock gate handrails lowered by one rail and new handrail made from salvaged materials installed on both edges of each lock wall and on upstream side of walkways on top of lock gates	ca. 1945
Construction-handrail on upstream side of dam service bridge	ca. 1945
Construction-upstream guidewall extension and mooring facilities	1951
Construction-visitors center in esplanade	ca. 1960
Construction-frame air-lock vestibule at upstream end door of central control station	ca. 1970
Addition-boat launches on lock walls	ca. 1970
Replacement-haulage units	ca. 1971 and 1973
Construction-metal and glass shelters around land wall control cabinets and at end of the guidewall of lock	ca. 1972
Removal-Lockmaster/Assistant Lockmaster residences from esplanade	ca. 1975
Removal-standby generator for machinery room of central control station	ca. 1975
Construction-emergency generator building	ca. 1975
Replacement--wooden plank hatches on dam service bridge with aluminum ones	ca. 1979
Installation-traveling mooring keels extending length of guidewalls of lock	1980

Upper Mississippi River Nine-Foot Channel  
Project, Lock and Dam Number 16  
HAER No. IA-26  
(Page 6)

Construction-new workshop building	1980-1981
Construction-concrete, metal, and fiberglass covers over machine pits on main lock	1983
Replacement-crane on dam	1983-1984
Replacement-light posts and light fixtures around lock	1984
Replacement-exterior wall covering of central control station and frame air-lock with brick one incorporated into main building	1985

B. Historical Context:

The special board of engineers which initially designed the Nine-Foot Channel Project between 1929 and 1931 saw the construction of Lock and Dam Complex 16 as a relatively high priority and placed it in the second group of projects to be constructed, those necessary to provide a dependable through six-foot channel. The board recommended that the complex include five roller gates, each with 100 feet clear openings, and 38 Tainter gates with 30-foot openings each. As actually built, dam system 16 included four roller gates, each with 80-foot clear openings, and 15 Tainter gates, each with 40-foot openings. These design changes were made in 1931 and 1932 after the Corps changed the proposed location of the complex from the downstream to the upstream end of Muscatine, Iowa.

The construction of Lock and Dam Complex Number 16 was relative uneventful. In one of the few unusual features of the construction project, the Corps awarded the contract to Central Engineering Company of Davenport, Iowa, to construct the lock. The contractor began to build the cofferdam on November 11, 1933, before either the test borings or temporary buildings had been completed. But, regardless of this, the preparatory work went quite smooth, with Ahrenholz and Beeler of Davenport, Iowa, being awarded the contract to build the temporary buildings at complex 16 on December 18, 1933, and finishing the task by February 16, 1934. The Corps of Engineers ordered Sprague and Henwood, Inc. of Scranton, Pennsylvania, to begin the test borings at the new site on January 4, 1934.

Most specific items of engineering significance at this complex relate to the dam. Dam 16 was the third dam designed and constructed in the Rock Island District. It was the last of the Rock Island dams to employ non-submersible roller gates and 1a and 1b Tainter gates. It was, however, the first dam in the district in which all the Tainter gates were operated by line shafts and motors housed in installations above each gate rather than from locomotive hoist cars running on the dam's service bridge. Dam 16 was also the first dam in the Rock Island District with 2a roller gate piers.

Upper Mississippi River Nine-Foot Channel  
Project, Lock and Dam Number 16  
HAER No. IA-16  
(Page 7)

The central control station at complex 16 was also the first 1b central control station built in the Rock Island District. Therefore, it is also the first complex in the district in which the central control station does not reflect the architectural style of the roller gate pier houses.

The dam system of Complex 16 consists of 10 1a-type Tainter gates, five 1b-type Tainter gates, four non-submersible roller gates, a linear, concrete-capped ogee spillway, and a submersible earth and sand-filled dike. The lock's dimensions are the standard 100 feet by 600 feet with additional footings for an auxiliary lock of standard dimensions. Lock lift is 9 feet. Normal upper pool elevation is 545.0 feet; this is about 14 feet above the tail waters below the dam at low water. When both pools are at their normal elevation, the difference is reduced to 9 feet or less.

The lock and dam elements of the complex took about three and a half years to complete at a cost of \$5,688,000. The complex was placed in operation as a unit of the Upper Mississippi River Nine-Foot navigation system on July 10, 1937. It was the third of the 1931-1940 Upper Mississippi River Nine-Foot Navigation Project complexes in the Rock Island District to go on line.

## PART II. TECHNOLOGICAL INFORMATION - LOCK

### A. General Statement:

1. Design Character: Standardized Ohio-Mississippi Lock Design. Drawing Number M-L 16 20/1.
2. Condition of Fabric: Good.

### B. Description of General Layout and Principal Elements:

1. Overall dimensions: Main lock chamber - 110 feet wide by 600 feet long by 40 feet high; adjoining incomplete auxiliary lock chamber 110 feet wide by 40 feet high. Lift - 9 feet. Drawing Number M-L 16 20/1.
2. Foundations: 30-foot-round timber pile with 25 to 30 feet sheet piling cutoff walls enclosing outside limit. Drawing Number M-L 16 20/2.
3. Walls: Reinforced monolithic concrete with steel reinforcement bars on their chamberward faces upstream and downstream from the lock gates. Land wall adjoins Illinois shore. Intermediate wall is riverward wall of main lock and landward wall of incomplete auxiliary lock. River wall of auxiliary lock ties to dam on north. Drawing Numbers M-L 16 20/4, 20/6, 20/9, 20/19, 20/20, 20/28, 40/1.
4. Structural System: See above.
5. Bullnoses: Concrete configurations at each end of intermediate wall. Drawing number M-L 16 20/19.



Upper Mississippi River Nine-Foot Channel  
Project, Lock and Dam Number 16  
HAER No. 1A-26  
(Page 8)

6. Upper and Lower Guidewalls: Extended monolithic reinforced concrete walls extending the landwall out of the lock chamber at either end to assist guiding of barge traffic into the lock. Drawing Number M-L 16 20/11.
7. Riverwall Extension: 500-foot-long cell foundation, concrete extension to upstream end of riverwall. Added in 1940-42 to assist in counteracting outdraft which made navigation into and out of the upstream end of the lock difficult. Drawing Number M-L 16 10/26A.
8. Guidewall Extension: Concrete-capped, timber crib extension to the upstream guidewall. Added in 1951 to assist in counteracting outdraft which made navigation into and out of the upstream end of the lock difficult.
9. Additional Mooring Facilities: Added in 1951.
10. Stage Recorder: Small concrete housing located at the end of the downstream guidewall. Equipment housed for the recording of river stages.

C. Mechanical Equipment:

1. Tainter Valves: Four cable drive lock valves of steel construction with electric motorized assembly. Valves are located in wells in lock. They are operated by switches in weatherproof control cabinets on lock walls, with a cabinet beside each gate recess. Control cabinets on landwall surrounded by metal and glass shelters since mid 1970s. Drawing Numbers M-L 16 25/1, 28/1, 20/12.
2. Gates: Two pairs of miter gates on main lock and one pair on upstream end of incomplete auxiliary lock. All three pairs are balanced on stainless steel pintels. Those in main lock are operated by arms, gears, and electric motor assemblies. Motor assemblies originally housed in machinery pits in lock walls adjacent to each leaf. Machinery pits for main lock machinery covered by raised concrete, metal and fiberglass enclosures in 1983. The gates are operated by switches in control cabinets. Bumper lines of chamber face of gates also of stainless steel. All other associated metal parts are of steel, stainless steel, or steel/nickel alloy. Drawing Numbers M-L 16 21/1, 21/17, 21/21, 22/1.
3. Lighting: Various freestanding single and double head lighting standards, installed in 1984.
4. Plumbing: Lock is watered by the Tainter valves (see above) serving a system of cast-in-place tunnels that enable the water level to be controlled on the interior of the lock.
5. Haulage Unit: Motorized winch assembly to assist towing of barges through lockage. Replacement units were installed in the mid-1970s.

6. Traveling Mooring Kevels: Two large cleats on rails which extends the length of both the upstream and downstream guidewalls. Installed in 1980, the kevels are used to assist towing of barges through lockage.

D. Other Elements:

1. Auxiliary Lock: Fixed miter gate without machinery and partial walls are located riverward of the main lock. It is equipped with wells for machinery placement, but was never completed or put into service. Drawing Numbers M-L 16 20/1, 20/5.
2. Boat Launches: Installed in ca. 1970, the launches are single-armed derricks of metal construction, used to load and unload materials as well as load lifeboat.

PART III. TECHNOLOGICAL INFORMATION--MOVABLE SECTION OF DAM

A. General Statement:

1. Design Character: Combination roller/tainter low dam system design. Drawing Number M-L 16 40/1.5
2. Architectural Character: 2a roller gate piers. Drawing Number M-L 16 40/2.
3. Condition of Fabric: Excellent.

B. Description of Exterior

1. Overall Dimensions: 1,315 feet in length. Drawing Number M-L 16 40/1.
2. Foundation: 30-foot-round timber pile with 25 to 30 foot sheet piling cutoff walls enclosing outside limit.
3. Pier House Walls: Monolithic reinforced concrete. Drawing Numbers M-L 16 41/1 and 41/2.
4. Structural System: Monolithic concrete/structural steel.
5. Fenders: Concrete fenders located at the base of each pier.
6. Openings:
  - a. In Overall Structures: 19 water-channels and 4 archways; clustered in groups by sizes, south to north--5 water-channels ca. 40 feet wide; 4 water-channels ca. 80 feet wide; 10 water-channels ca. 40 feet wide; 4 archways ca. 60 feet wide. Drawing Number M-L 16 40/1.

Upper Mississippi River Nine-Foot Channel  
Project, Lock and Dam Number 16  
HAER No. IA-26  
(Page 10)

- b. In Pier Houses: 1 doorway and 11 three-pane windows for each of five pier houses. Drawing Number M-L 16 40/2.
    - (1) Doorways and doors: 5
    - (2) Windows: 55
  - c. In Access Tower: 2 doorways and doors. Drawing Number M-L 16 40/4.
7. Roofs:
- a. Shape, covering: Pier houses have flat roofs covered in membrane/tar composition. Roof covering access tower stairway removable. Drawing Number M-L 16 41/3.
  - b. Towers, abutments, piers: 2 abutments; lockwall abutments includes access tower; 22 piers (13 tainter gate piers, 3 2a-style roller gate piers, 2 2a-style transition piers or combination tainter and roller gate piers, and 4 service bridge extension piers); 5 2a-style piers have pier house towers. Drawing Numbers M-L 16 40/1, 40/4, 40/18, 40/3, 40/2, 40/6, 40/11, 40/12, 40/14, 40/18, 40/20, 40/21, 40/31.
8. Service Bridge:
- a. Shape: Arched spans in a segmental series.
  - b. Materials: Structural steel. Drawing Number M-L 16 53/1.
- C. Description of General Layout and Principal Elements:
- 1. Access Plan: Simple stairway in the access tower which itself is part of the abutment resting on the riverwall of the auxiliary lock. This stairway leads to service bridge deck where walkway/rail track extends full length of dam. Access to all five pier houses directly off deck. Access to storage yard on Hog Island by simple exposed stairway at the eastern end of service bridge. Drawing Numbers M-L 16 40/1, 40/4, 53/1, 53/4, 53/8, 53/11, 53/12.
  - 2. Stairways: In access tower--reinforced concrete with pipe railing; at end of service bridge extension--open metal with pipe railing. Drawing Numbers M-L 16 40/4, 53/1.
  - 3. Flooring: In pier houses and access tower--reinforced concrete; on service bridge deck--wooden plank. Drawing Numbers M-L 16 40/4, 53/10.
  - 4. Wall and Ceiling Finish: Reinforced concrete. Drawing Numbers M-L 16 40/4, 40/5.
  - 5. Hardware: Brass.

Upper Mississippi River Nine-Foot Channel  
Project, Lock and Dam Number 16  
HAER No. IA-26  
(Page 11)

D. Mechanical Equipment:

1. Movable Gates: Five 40-foot wide by 20 feet high, 1b-type Tainter gates operated by line shafts and motors housed in installations above each gate; four, 80-foot wide by 20 feet high, non-submersible roller gates operated on tooth track by chain driven hoist machinery located in pier house adjacent to each gate; ten 40-foot wide by 20 feet high, 1a-type Tainter gates operated by line shafts and motors housed in installations above each gate. Drawing Numbers M-L 12 48/1, 48/6, 48/7, 47/2, 48/3, 48/4, 55/1, 54/1.
2. Movable Crane: 30-ton vertical lift electric crane with 70-foot boom (replaced in 1983-84) used for moving parts and equipment. Sits on original (ca. 1937) crane trolley, which also supports additional bridge crane used for lifting emergency bulkheads, etc. Trolley rides on 15-gauge track system running entire length of service bridge deck. Drawing Numbers M-L 16 53/13.
3. Lighting: Fixtures as of times of installation - 1936-37. Rewiring may have taken place over the years--extent is unknown. Drawing Number M-L 16 56/1.

E. Other Elements:

1. Ogee Spillway: 1,700-foot-long linear, concrete-capped, spillway extends from the northern end of the southernmost transition dike. Drawing Number M-L 16 40/1, 52/1, 52/2.
2. Earth Dike: Three dikes--415-foot-long 3 to 1 earth and sand filled transition dike with riprap revetment extending from northern edge of Hog Island to ogee spillway; similar transition dike extends from northern edge of ogee spillway to overflow earth and sand filled dam which itself extends to the Iowa side levee, protecting the Chicago, Milwaukee, St. Paul, and Pacific Railway tracks. This transition dike and overflow dike together are 726 feet long. Drawing Numbers M-L 16 40/1, 52/1, 52/2.
2. Emergency Bulkheads: Temporary blocking units of riveted structural steel girder construction placed in gate openings in periods of emergency or repair. Drawing Numbers M-L 16 58/1, 58/2.
3. Emergency Bulkhead Car/Tracks: Located in storage yard, the flat cars designed to store and access bulkheads. Drawing Number M-L 16 40/30.
4. Storage Yard: 200-foot-long area on Hog Island extending from north abutment under service bridge extension, i.e., under last four archways in dam. The yard contains replacement parts for gates, bulkheads on track cars and related repair items. Drawing Number M-L 16 40/30.
5. Flatcar Assembly: Car for transportation of gate bulkheads and repair materials on deck of service bridge. Drawing Number M-L 16 53/13.

#### PART IV: TECHNOLOGICAL INFORMATION-ESPLANADE AREA

##### A. Description of Esplanade--General Layout:

1. Design Character: Standardized park/service area and access road component. The esplanade area was originally designed to accommodate the Central Control Station, Lockmaster and Assistant Lockmaster residences, access road, parking, and other service-related functions. Major site alterations have occurred since that time and are noted in the following items.
2. Architectural Character: 1b Central Control Station. Drawing Number M-L 16 70/1.
3. Historic Landscape Design: Based on standardized designs--see drawings for Lockmaster's residences.

##### B. Condition of Site and Structures: Altered

1. Central Control Station - Exterior: Standardized 1b construction. Major alteration in 1985 rehabilitation project placed insulation and face brick over original concrete finish. For original, see Drawing Number M-L 16 70/1. Drawings for rehabilitation available from Rock Island District Office.
  - a. First Floor: Contains machinery room where central control panel is located, bathroom, main office, and basement stairway access. Standby generator which dominated machinery room removed in mid-1970s. Drawing Number M-L 16 70/2.
  - b. Basement: Contains storage and equipment rooms. All interior finishes altered from original construction. Drawing Number M-L 16 70/2.
2. Lockmaster's/Assistant Lockmaster's Residences (standardized, Colonial Revival with side porch): The structures has been moved off site. Related structures such as garages have been demolished.
3. Outbuildings: Various sheds and service buildings have been erected from time to time as demands required--none have particular significance or contribute to the site. A brick and steel visitors' center was erected along side the land wall of the lock in ca. 1960. A metal emergency generator building was constructed just upstream from the Central Control Station in the mid-1970s. It is a standardized element. A new garage structure of brick and steel was erected on the old site of the Lockmaster's residence ca. 1980. This element is also standardized.

## PART V: SOURCES OF INFORMATION

- A. Original Architectural/Engineering Drawings: Mississippi River Lock and Dam 16, lock operations folio; Mississippi River, Lock and Dam 16, dam operations folio, Rock Island District Office-Construction Drawings--Mississippi River Locks and Dams 1937-1986, (passim), Rock Island District Library, Clock Tower Building Annex, Rock Island, Illinois.
- B. Early Views: Over 1,600 high quality 8x10 black and white construction photographs: Lock and Dam Number 16-Photo Book groups 121.6, 121.63, 121.62 (5 vols.), and Esplanade Work Lock and Dam 16, Rock Island Arsenal, Rock Island, Illinois.
- C. Interviews: Present and past personnel--Lock and Dam Number 16
- D. Bibliography:
  - 1. Primary and unpublished sources: National Archives Record Group 77, Entry 81, Chicago National Archives and Records Center; National Archives Record Group 77, Entries 111 and 112, Washington National Records Center, Suitland, Maryland; Chief of Engineers Annual Reports, 1927-1987; see also bibliography in HAER No. IA-23 narrative history.
  - 2. Secondary and published sources: See bibliography in HAER No. IA-23 narrative history.
- E. Likely Sources Not Yet Investigated: National Archives Record Group 77, Entry 107 (132 linear feet), Washington National Records Center, Suitland, Maryland; National Archives Record Group 77, Entry 1656, exact repository unknown; and National Archives Record Group 77, Entries 608, 609, and 610 (collective total 5 linear feet), National Archives, Washington, DC.
- F. Supplemental Material: 83 film canisters of 1931-1939 silent movies of the construction process taken by the Corps of Engineers, Rock Island District Office, Rock Island Arsenal, Rock Island, Illinois.
- G. Notes: The notes for this outline are contained in the notes section of HAER No. IA-23 narrative history.